Facts and ideas from anywhere

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AT THE MERCY OF OIL

Most movement in the industrialized world is dependent on fossil fuel (oil, coal, and natural gas). Not only does fossil fuel power our vehicles, but the plastics in vehicles and the roads they ride on are made in part by oil. Many of our clothes and medicines are made in part by oil. Amanda Little, who has published widely on energy, technology, and the environment, has written *Power Trip: From Oil Wells to Solar Cells—Our Ride to the Renewable Future* (1). Some of her observations follow.

Oil accounts for roughly half of our nation's fossil fuel usage. What it provides by and large is movement. America's transportation sector is almost entirely dependent on petroleum, which can be refined not just into gasoline, kerosene, and motor oil but into the petrochemicals that are the basic building blocks of a vast range of consumer products. What petroleum doesn't provide is electricity, which accounts for the other half of America's fossil fuel use. Electricity generation in the USA comes from coal (50%), natural gas (20%), and nuclear sources (20%). Natural gas essentially is petroleum that has been slow-cooked over time into a gaseous form.

Since nearly all plastics, polymers, inks, paints, fertilizers, and pesticides are made from petrochemicals and all products are delivered to market by trucks, trains, ships, and airplanes, virtually nothing in our offices or on our bodies is not dependent on fossil fuels. Ms. Little described sitting in her office at a desk made of Formica (a plastic), wearing a sweatshirt made of fleece (a polymer) and yoga pants made from Lycra (a polymer), sipping coffee shipped from Zimbabwe, eating an apple trucked from Washington, surrounded by walls covered with oil-derived paints, jotting notes in petroleum-derived ink, typing words on a petrochemical keyboard into a computer powered by coal plants. The breakfast cereal and veggie burger came from crops treated with oil-derived fertilizers. She spoke of Tylenol made from acetaminophen, refined from petroleum. The glossy magazines on her desk and a packet of photos were printed with petrochemicals; the mascara, lip balm, eyeliner, and perfume in her pocketbook, like most cosmetics, have key components derived from oil. The synthetic fabrics, like Spandex and nylon, as well as plastic sutures and photographic computed tomographic images come from petrochemicals. Energy, in other words, is everything and everywhere, and our survival is dependent on it.

To get our oil we transfer $750 billion every year to foreign countries, most of whom do not like us. The USA contains about 5% of the world's population and uses about 25% of the oil produced from the earth each year. In 2008, roughly 25 barrels of oil (with 44 gallons per barrel) were used per person in the USA; Europeans, by comparison, used 17, and the Japanese, 14.

The world has not always been dependent on oil. It was discovered in Pennsylvania in 1859, and the first oil well was drilled there. Initially, oil was used to produce kerosene, which burned brighter, cleaner, longer, and more safely than whale oil. The fossil fuel was used only for light until January 1901, when a well drilled at Spindletop in Beaumont, Texas, shot 150 feet high, and before the well could be capped more than 60,000 barrels of oil had gone to waste. The day of the Spindletop discovery was the day that the USA became a world power! That first gushing well at Spindletop could alone produce half the total US output at the time—as much as 37,000 wells in the Eastern USA and twice the production of Pennsylvania, the leading oil state at the time. A year later, in January 1902, 440 gushers had been tapped in the area. When Spindletop was first discovered, crude oil sold in the USA for $1.00 a barrel, and by the time the field was producing at its peak volume, overproduction had sunk the price to 3¢ a barrel—cheaper than the drinking water provided to the field workers. About the time that Spindletop was discovered, the automobile appeared in the USA. We have been dependent on the stuff ever since. Railroads and ships soon shifted from coal to oil. It wasn't long before John D. Rockefeller had ruthlessly cornered the oil market in the USA. His company in 1911 was broken up into 12 independent companies.

World War I, the first major war of the Industrial Age where close to 13 million lost their lives, was the first where petroleum-powered battleships, tanks, and trucks had replaced horses, trains, and slower ships that had moved troops in wars past. It was Winston Churchill, serving in the admiralty in 1911, who decided to transfer Britain's entire naval fleet from coal-powered engines to oil, a new and riskier fuel but one that promised the

great strategic benefits of faster ships and more efficient use of manpower.

The USA hit peak oil production in 1970, and since that time we have been buying more and more oil from other countries. Our proven domestic reserves stand at 21 billion barrels, enough at current levels of consumption to meet our needs for roughly 1000 days if we stopped importing any oil. There are another nearly 700 million barrels in the Strategic Petroleum Reserve, held in underground caverns along the Gulf Coast, but that oil would give us only another 34 days of supply. As the nation's home-grown oil supplies become ever harder to come by, we are faced with tremendous cost—not just that of drilling for oil at the ends of the earth but of protecting our access to oil and abundant supplies from overseas, particularly from the Persian Gulf. We are now almost entirely at the mercy of foreign producers to feed our oil addiction.

The USA is a military superpower because we have oil. Oil builds and sustains our military superpower. The Pentagon is the largest consumer of petroleum in the USA. In recent years, it has used 130 to 145 million barrels of oil annually, comprising 2% of America's total petroleum demand. That translates to nearly 400,000 barrels per day—roughly the total daily energy production of the United Arab Emirates. Our troops are only as powerful as the flow of the fuel that sustains them. Oil makes this country strong, and dependency makes us weak. Iraq has the world's third largest oil reserve after Iran and Saudi Arabia.

In World War II, the Allied Forces used 7 billion barrels of oil. Oil is the most convenient form of energy because it generates 40% more thermal capacity than does coal. The major weapon systems used in World War II—long-range bombers and other aircraft carriers, surface warships, submarines, tanks, and trucks—were fueled by oil. When the USA entered World War II, it produced two thirds of the world's petroleum. Nearly all of the oil—6 billion of the 7 billion gallons—that fueled the Allied war effort came from US fields. Only the Soviet Union during World War II among the other great powers had any significant oil production. The Germans and Japanese were shut out of the major foreign oil-producing areas, and to get oil was Germany's major motivation for invading the Soviet Union in June 1941. Japan hoped to conquer all of Southeast Asia to get oil from the East Indies and open the shipping lanes between those fields and Japan. At the beginning of World War II, Japan received most of its oil needs from the USA. Shortage of petrol in part caused Japan to resort to its strategy of kamikaze attacks. If the pilots were going only one way, they would need just half the fuel.

It was Franklin Delano Roosevelt who met with Abdul Aziz Ibn Saud, king of Saudi Arabia, in February 1945 and established a collaborative relationship with the king, and that opened up our access to Middle East oil. Ms. Little mentioned that no scene in modern history intrigued her more than the meeting between Roosevelt and Ibn Saud. All the presidential administrations that followed Roosevelt—Truman, Eisenhower, Nixon, Carter, and Reagan—sought to build on this precedent and further cement US relations with the Saudis. Our presidents worked to ensure that the oil so crucial to our domestic prosperity and military victories would flow freely from the region's wells. The security of the kingdom had become tantamount to the security of the increasingly oil dependent USA. To give an inkling of how much fuel war requires, a single B52 bomber uses up to 45,000 gallons in a single mission. Ms. Little interviewed James Woolsey, the former chief of the Central Intelligence Agency under the Clinton administration. He stated, "Americans need to know that their oil demand is fueling Al Qaeda. Nearly $100 billion has been spent on spreading anti-USA propaganda around the Middle East and almost all of that is oil money."

Ms. Little also had a chapter on NASCAR (National Association for Stock Car Auto Racing). NASCAR holds 17 of the top 20 most attended US sporting events and claims 75 million fans. During the 9 months of its racing season, it's second only to football as the most viewed professional sport on television. It broadcasts its races in more than 100 countries. The sport grew out of the 1930s prohibition era in America's Deep South when rural bootleggers rigged standard-looking cars with high-powered engines to outrun the law. Fans still cling to this unabashedly roughneck image. In a 500-mile race averaging 5 miles per gallon, each car consumes roughly 100 gallons of fuel, and there are 43 cars per race such that each event consumes approximately 4400 gallons of gasoline. With about 96 US NASCAR races per year, that totals over 1 million gallons. And several gallons of oil go into the production of synthetic rubber tires. One car competing in a NASCAR event burns through 40 to 80 tires per race. Each team also has a convoy of 18-wheelers that hauls its race cars across the country from track to track, cumulatively traveling hundreds of thousands of miles per year. These fully loaded trucks also get around 5 miles per gallon, which means that million of gallons are consumed just getting the cars to the races. These numbers are small compared to the volume of fuel that goes into America's military endeavors or our daily commutes. But NASCAR is sheer entertainment. Four hundred companies spent more than $1.5 billion in 2008 to sponsor races, cars, and drivers.

But it was the success of the automobile that kept the oil industry alive and thriving. Ford's cars debuted just as Edison's invention of the light bulb was killing the demand for lighting fuel. In the nick of time, Ford had unwittingly created a new market for oil—transportation. In the USA we consume on average 1.5 gallons of gasoline per person per day. This fuel consumption, which quadruples that of the average European, is due in part to the great distances traveled in our largely suburban, auto-dependent lifestyles but also to the fact that we have some of the lowest fuel economy standards of any industrialized nation. In 1950, there were just over 150 million citizens in the USA and almost 50 million cars on the road, more than 1 for every household. Today, we have approximately 305 million people and more motorized vehicles than people. The proliferation of cars among Americans gave rise to the first drive-in fast foot joint (1921), the first shopping mall (1922), the first motel (1925), and the first drive-in movie (1933). The automobile helped bring about an era of sexual liberation, enabling

teenagers to escape the surveillance of their parents, and such innovations as heaters, air-conditioners, and tilt steering wheels aided that process. President Eisenhower created the interstate highway system, a sophisticated road network crucial to America's long-term growth and security.

The American lifestyle today of course is heavily suburban and car reliant. Nine of 10 Americans drive to work, and 77% of these commuters drive alone. We now have nearly 4 million miles of heavily subsidized well-maintained roadways, relatively low gas taxes, and a hobbled rail system. A rural existence is even more auto dependent. Long-distance joy rides are a passion in the USA. Three quarters of Americans vacation in cars. The average American driver travels between 30 and 40 miles a day, or nearly 14,000 miles a year, the distance around the equator every 1.8 years. Our national car fleet gets an average fuel economy of just under 23 miles per gallon—roughly half the efficiency of cars in Japan and the European Union, which have average fuel economies equivalent to nearly 43 miles per gallon. We come in last in the race on fuel economy among developed nations.

The automobile manufacturers now are making cars not so much from steel and glass but from plastics, which are basically of 2 types—polypropylene and polycarbonate. These plastic car shells are lightweight and thus conserve oil, but oil is also one of their main ingredients. Both polycarbonate and polypropylene, like most plastics, are derived from petroleum and natural gas. Petroleum goes into nearly 80,000 different types of plastics: Styrofoam burger boxes, coffee cups, plastic soda bottles, water jugs, shopping bags, candy wrappers, deflated sacks of chips, Saran Wrap, sandwich baggies, Igloo thermoses, melted ice packs, abandoned tires, beach chairs, foam pads for sleeping bags. Inside the car, plastics include the dashboard, steering wheel, gear shift, stereo modules, floor pads, and polyester seat coverings.

As Ms. Little wrote, "Most of us come into contact with more plastic every day than we do human skin or any other substance." These include keyboards, containers, escalator handrails, elevator buttons, door handles, Formica countertops, plastic forks, straws, coffee lids, bottle tops, phone receivers, plastic fabrics (Spandex, fleece, Lycra, Modal, polyester, rayon, nylon, ultra suede, and leatherette). These all are oil byproducts. The fossil fuels used to manufacture plastics account for roughly 5% of total annual US energy consumption, the equivalent of roughly 600 million barrels of oil. And plastics will only become more pervasive in our lives—not less. There are few natural substitutes for all of these plastic products. Plastics do not get rusty, rotten, weathered, dull, or tarnished. Because they break down either incredibly slowly or not at all, our landfills are getting bigger and bigger. Ms. Little stated that "eliminating plastics from our lives would redefine our identities on a level far deeper and more emotionally immediate, even than removing oil from our gas tanks." This is a paradox of plastics. Their durability, something that makes them such an environmental nuisance, is also what makes them so impressively utilitarian.

Plastics are hydrocarbons, compounds consisting of carbon and hydrogen, arranged in different formations. (Some also contain other atoms including nitrogen, chlorine, and silicon.) Hydrocarbons are found in nearly all organic substances—coal, plants, and animals—but they are most abundant in and most easily extracted from crude oil and natural gas. The energy equivalent of roughly 1 gallon of oil yields 3 pounds of plastics such as polypropylene. Polypropylene is produced at a global rate of 65 million tons a year. Polypropylene is found in soda bottles, camera film, fleece jackets, upholstery blends, and most other versatile fabrics and materials. Polypropylene is used in Tupperware and is also the quick-drying insulating fiber in many types of long underwear. Polycarbonate, used in the shell of the Smart car, for example, is also used to make hard hats, eyeglass lenses, and water cooler jugs. Polystyrene comprises everything from computer and appliance casings to Scotch tape dispensers and Styrofoam. Polyvinyl chloride is used in products such as industrial-strength sewage pipes. Acrylics include Plexiglas, latex paints, and Superglue. Polyamides are used to make everything from nylon stockings and suitcases to skateboard wheels, bullet-proof vests, and fire-resistant clothing. Finally, polyurethanes are used in automobile clear coats, furniture foam, and home insulation.

Nowhere is the durability of plastics more valuable than in medicine. Pacemakers and artificial heart valves are among the dozen of implantable medical devices made from plastics. The titanium and plastic hips and prosthetic legs and contact lenses and bioabsorbable polymers are all plastics. Many medical implants and prostheses are made of Silicon, which is a flexible, lightweight, inert plastic that can be manufactured to bear a remarkable similarity to the look and feel of flesh. Countless nonsilicon plastics are commonly used in medicine, including syringes, blood bags, surgical gloves, dressings, catheters, and intravenous tubes, which are made of polyethylene nylon and flexible polyvinyl chloride. These disposable materials guarantee sterility, cutting down on potential infections that were far more common in the preplastics era.

Certain forms of chemotherapy also have core petroleum-derived ingredients called nitrogen mustards. Most pharmaceuticals come from petrochemicals. Carboxylic acids and anhydrides are used to make Novocaine and acetaminophen as well as sedatives, tranquilizers, decongestants, antihistamines, and antibacterial soaps. Esters and alcohols derived from fossil fuels are used in fermentation processes that produce antibiotics. Glycols and celluloses are used to coat pills and bind together the contents of tablets. Petrochemicals may be found in everything from penicillin, cough syrup, and rectal suppositories to radiological dyes and x-ray film. Petroleum byproducts also are in most cosmetics—lipstick, foundation, mascara, cleansers, moisturizing agents, alcohols, binders, and aromatic chemicals. Petrochemicals are the basic ingredients in industrial glues and adhesives as well as the dyes that make up ink and paint. Each year in the USA roughly 100 billion pounds of plastics are produced annually—nearly one quarter of all global plastic production.

And then there are the fertilizers. Each year American farmers apply $6.2 billion of fossil fuel–based fertilizers to their crop lands. Nitrogen, phosphorous, and potassium are the 3 most

common nutrients in the fertilizers applied to American farmlands. The main form of nitrogen fertilizer is in anhydrous ammonia, and natural gas is its primary feed stock. America's food system accounts for roughly 10% of annual energy demands. While fertilizers account for roughly a quarter of the energy that sustains American agriculture, huge volumes of petroleum and electricity are also used to operate farm machinery, power irrigation systems, process crops, and package, refrigerate, and transport them to stores, restaurants, and kitchens.

We are indeed at the mercy of fossil fuels. Becoming energy independent is a dream without a radical change in the US lifestyle.

BROKE

President Obama submitted in January 2010 his proposed 2011 $3.8 trillion budget, which is scheduled to take effect October 1, 2010, if approved by Congress (2–5). It includes a $1.6 trillion deficit, the largest since World War II. This deficit alone represents 9.2% of our gross domestic product. His fiscal 2011 budget includes nearly $1 trillion (12 zeros) in tax increases over the next decade on families with incomes above $250,000 a year.

In years 2009, 2010, and 2011, the federal government will borrow an estimated $3.7 trillion. That is more than the entire accumulated national debt for the first 225 years of US history! We need to limit spending now; drop the health care bill, cancel the unspent stimulus from last year, kill the $150 billion new stimulus that has already passed the House, and bar all repaid bailout cash from being respent.

Even if our interest rates do not rise, within 12 years the largest item in our national budget will be interest on the debt. The current deficit short term is caused by the recession, various bailouts, 2 wars, several tax cuts, and recent increases in federal spending. The large and growing long-term one is due mainly to the increasing cost of Social Security, Medicare, and Medicaid.

The citizens of the USA owe $12.3 trillion in treasury debts to banks, individuals, and foreigners. That's about $40,000 per person living in the USA, and it's not counting the amount our states owe or what we owe to our individual creditors. Federal spending jumped from $1.8 trillion in 2008 to an estimated $3.1 trillion in 2009. In 1963, Social Security and Medicare used 15% of all federal tax receipts, and defense, 50%. In 2009, Social Security and Medicare are an estimated 40% of federal tax receipts and defense is 26%. When the economy falters so does the government's income from taxes it collects from corporations and individuals. The government collected $2.5 trillion in 2008, and it collected $2.1 trillion in 2009, a $400 billion shortfall.

Fighting a war is one of the most reliable ways to create a big debt. The British, for example, finished repaying their World War II debt to the USA in 2007. Germany will finish repaying its World War I reparations in 2010. Every Allied nation except Finland defaulted on its World War I debt to the USA. The wars in Afghanistan and Iraq have cost the US $915 billion through 2009. The present administration has allocated another $130 billion to the wars for 2010. Our federal government is acting irresponsibly.

THE US TAX BURDEN

The US tax revenues in 2008—including local, state, and federal taxes and Social Security—equaled 27% of gross domestic product (6). According to the Organization for Economic Cooperation and Development, that's not bad. Total tax revenue as a percentage of gross domestic product in 2008 in Denmark was 48%; Sweden, 47%; Belgium, 44%; France, 43%; Italy, 43%; Finland, 43%; Austria, 43%; Germany, 36%; United Kingdom, 36%; and Canada, 32%. Our tax burdens will surely increase in 2011.

MUCH MORE THAN ONE IN A HUNDRED

On December 28, 2009, State Senator Scott Brown, the Republican nominee in the Massachusetts senate election, promised that he would be the 41st vote against the health care bill (7, 8). At the time, only 23 days before the election, Mr. Brown was trailing Democrat Martha Coakley by 20 points, and she was on her 6-day Christmas break from campaigning. Twenty-two days made a difference. He beat Ms. Coakley 52% to 47% in the state that in the last 4 presidential elections voted more democratic than any other, and the man he replaced, Senator Ted Kennedy, had been the biggest advocate for decades for health care change. Brown's election is simply remarkable and ironic at the same time.

WITHOUT HEALTH INSURANCE

The national average of residents without health insurance is 15.5% (9). The state with the highest percentage of uninsured residents is Texas, 24.9%, followed by New Mexico, 23.0%; Florida, 20.5%; Louisiana, 20.1%; and Arizona, 19.6%. In contrast, the 5 states with the lowest percentage of uninsured residents include Maine, 9.5%; Wisconsin, 8.9%; Minnesota, 8.7%; Hawaii, 8.1%; and Massachusetts, 7.1%. We Texans can do better. Is it the warm weather?

IT'S CHINA'S TIME

In 2009, for the first time more new cars were bought in China than in the USA; Chinese investment in US companies was greater than US purchases of Chinese companies; and China moved past Germany to become the world's top exporter (10, 11). In 2009, Chinese buyers bought $3.9 billion of US assets, and US buyers bought $3 billion in Chinese assets. The Chinese government has the world's largest reserves, more than $2 trillion. That's possible when a country exports profusely but allows relatively few imports. We owe the Chinese about $1.5 trillion. China's 2009 exports were more than $1.20 trillion compared with $1.18 trillion for Germany. China overtook Germany in 2007 as the third largest economy and is expected to unseat Japan as number 2 behind the USA in 2010. Chinese economic growth in 2009 was just over 8%, whereas the USA had no growth. The population of Germany is 80 million; that of the USA, 306 million; and that of China, 1300 million. Nevertheless, China is still one of the world's poorest countries. In

2008, it ranked 130th among economies in per capita income according to the World Bank. In 2007, *The American Journal of Cardiology* received no manuscripts from China; in 2009, it received quite a few good manuscripts from China!

ISRAELI ENTREPRENEURSHIP

Dan Senor and Saul Singer have recently published *Start-Up Nation,* which demonstrates that Israel represents the greatest concentration of innovation and entrepreneurship in the world today (12). In 2008, per capita venture capital investments in Israel were 2.5 times greater than in the USA, more than 30 times greater than in Europe, 80 times greater than in China, and 350 times greater than in India. Comparing absolute numbers, Israel, a country of 7.1 million people, attracted close to $2 billion in venture capital, as much as flowed to the United Kingdom's 61 million citizens or to the 145 million living in Germany and France combined. And Israel was the only country to have a meaningful increase in venture capital from 2007 to 2008. After the USA, Israel has more companies listed on NASDAQ than any other country in the world, including India, China, Korea, Singapore, and Ireland.

Israel is the world leader in the percentage of the economy that is spent on research and development. Israel's economy has grown faster than the average for the developed economies of the world in most years since 1995. Even during wars, Israel did not slow the country's research and development. During the 6 years following 2000, Israel was hit not just by the bursting of the global tech bubble but by the most intense period of terrorist attacks in its history and by the second Lebanon War. Yet, Israel's share of the global venture capital market did not drop. Indeed, it doubled from 15% to 31%. And the Tel Aviv stock exchange was higher on the last day of the Lebanon War than on the first, as it was after the 3-week military operation in the Gaza Strip in 2009. Almost half of the world's top technology companies have bought start-ups or opened research and development centers in Israel. Cisco alone has acquired 9 Israeli companies and is looking to buy more.

The Israeli economy has grown 50-fold during the country's 60-year existence. The first great leap occurred from 1949 to 1970, a period during which per capita gross domestic product almost quadrupled and the population tripled, even amidst Israel's engagement in 3 major wars. The second was from 1990 until today, during which time the country was transformed from a sleepy backwater into a leading center of global innovation. The first period of expansion was achieved through an entrepreneurial government that dominated a small, primitive, private sector; the second period, through a thriving entrepreneurial private sector that was initially catalyzed by government action.

The reason for Israel's technology success is surely multifold. One explanation may be that adversity, like necessity, breeds inventiveness. The population is talented. Their required service in the military plays a part. The Israeli military fosters entrepreneurship and produces tenacity, an insatiable questioning of authority, a determined informality, a unique attitude toward failure, teamwork, mission, risks, and cross-disciplinary creativity. We could also learn something from their medicine system.

SMOKING HABITS CHANGING

Melinda Beck, writing in *The Wall Street Journal,* had an interesting piece on present-day smokers (13). She indicated that half of the US population lives in areas where smoking is banned in workplaces, bars, and restaurants. More than 70% of Americans do not allow smoking in their homes, including about half of current smokers. Taxes have pushed the cost of smoking to $10 per pack in New York City, and the social cost—disgusted looks and lectures from friends and family—have escalated. Such inconveniences are changing the smoking habits of those still hooked on cigarettes. Even though the percentage of US adults who smoke has stalled at about 20% in recent years, smokers are smoking fewer cigarettes than they used to (an average of 13 per day, down from 21 in 1981), and about 25% of smokers do not smoke every day. One government study found that half of American smokers either don't smoke daily or smoke fewer than 6 cigarettes a day. Research in 2009 disclosed that 18- to 29-year-olds were twice as likely as those aged 50 to 64 to be nondaily smokers.

Light smokers still put their health at risk. Dr. Thomas R. Frieden, now director of the Centers for Disease Control and Prevention, who helped bring down smoking rates in New York City from 21% to 15% when he was the city's health commissioner (from 2002 to 2009), has stated that as few as 3 cigarettes daily increase the likelihood of heart and brain attacks.

Daniel F. Seidman (14), director of smoking cessation services at Columbia University Medical Center, recently authored *Smoke Free in Thirty Days* and described some smoking triggers:

- Social smoking: to promote belonging to a group—an image tobacco ads cultivate.
- Secret smoking: to hide their habit—from children, spouses, friends, parents, and coworkers—because it's not part of the image they want to project. They often smoke alone and smoke only when safe from getting caught.
- Stress smoking: to relieve stress, another notion promoted by tobacco ads. Rarely, however, can smokers describe how smoking helps them cope with the challenges in their life.
- Emotional smoking: to stifle unpleasant emotions, such as anger or frustration. Using cigarettes to manage anger, however, tends to backfire.
- Nonthinking smoking: to not question why one smokes.
- Worried-about-weight smoking: to suppress the appetite. The health risks of smoking, however, are greater than the risks of being overweight. Smoking also stains teeth, ages the skin, and leaches calcium from bones.
- Scared-to-stop smoking: to fear inability to cope with life without cigarettes. Many who hold that view have never tried to stop. Not learning to live without cigarettes may be harder than quitting.

Seidman opined that the more smokers understand why they smoke, the greater their chances for beating the habit.

MARIJUANA, A MEDICINE?

According to Mathews (15), <20 randomized, controlled clinical trials have been conducted to study marijuana for all possible uses. All these trials together involved only about 300 patients. Thus, the evidence is far short of that typically required by the Food and Drug Administration for a pharmaceutical to be marketed in the USA. Nevertheless, some studies suggest that marijuana can benefit patients such as those with neuropathic pain, which is caused by certain types of nerve injury, and in bolstering appetite and treating nausea, as in cancer patients undergoing chemotherapy. Its effect in epilepsy and immune diseases, such as systemic lupus erythematosus, has been inconclusive, and there are side effects such as tachycardia, short-term memory loss, anxiety, and hallucinations.

The Food and Drug Administration does not regulate marijuana, so the quality and potency of the product available in medical-marijuana dispensaries vary. Although states have been legalizing medical use of marijuana since 1996 when California passed a ballot initiative, the idea remains controversial. Opponents say such laws open a door to wider cultivation and use of the drug by people without serious medical conditions. That concern is heightened when broadly written statutes, such as California's, allow wide leeway for physicians to decide when to write marijuana recommendations. Advocates of medical-marijuana laws say certain seriously ill patients can benefit from the drug and should be able to access it with a physician's permission. The following states allow medically qualified patients access to marijuana: California, Nevada, Oregon, Washington, Montana, Colorado, New Mexico, Alaska, Michigan, Vermont, Hawaii, and Maine. I understand that 60% of the economy of Mendocino, California, involves marijuana production. I have gone back and forth on this particular issue.

Dr. David L. Nathan, a psychiatrist in Princeton, New Jersey, in an editorial in *The Wall Street Journal,* made the case for decriminalization of marijuana (cannabis) (16). He argued that marijuana prohibition does not prevent widespread use of the drug and that its criminalization clogs our legal system with the small percentage of users and dealers unlucky enough to be prosecuted. In his view, legal cannabis would never become the societal problem that alcohol already is. He was far more concerned about his patients' consumption of alcohol than pot. Alcohol of course may induce violent or dangerous behavior and often irreversible physiologic dependence; marijuana does neither. Chronic use of cannabis raises the risk of lung cancer and leads to weight gain and lingering cognitive changes, but chronic use of alcohol can cause pancreatitis, cirrhosis, and

Table. Mean independent group scores in each of the three categories of harm, for 20 substances, ranked by their overall score, and mean scores for each of the three subscales*

	Physical harm				Dependence				Social harm			
	Mean	Acute	Chronic	Intravenous	Mean	Pleasure	Psychological dependence	Physical dependence	Mean	Intoxication	Social harm	Health care costs
Heroin	2.78	2.8	2.5	3.0	3.00	3.0	3.0	3.0	2.54	1.6	3.0	3.0
Cocaine	2.33	2.0	2.0	3.0	2.39	3.0	2.8	1.3	2.17	1.8	2.5	2.3
Barbiturates	2.23	2.3	1.9	2.5	2.01	2.0	2.2	1.8	2.00	2.4	1.9	1.7
Street methadone	1.86	2.5	1.7	1.4	2.08	1.8	2.3	2.3	1.87	1.6	1.9	2.0
Alcohol	1.40	1.9	2.4	NA	1.93	2.3	1.9	1.6	2.21	2.2	2.4	2.1
Ketamine	2.00	2.1	1.7	2.1	1.54	1.9	1.7	1.0	1.69	2.0	1.5	1.5
Benzodiazepines	1.63	1.5	1.7	1.8	1.83	1.7	2.1	1.8	1.65	2.0	1.5	1.5
Amphetamine	1.81	1.3	1.8	2.4	1.67	2.0	1.9	1.1	1.50	1.4	1.5	1.6
Tobacco	1.24	0.9	2.9	0	2.21	2.3	2.6	1.8	1.42	0.8	1.1	2.4
Buprenorphine	1.60	1.2	1.3	2.3	1.64	2.0	1.5	1.5	1.49	1.6	1.5	1.4
Cannabis	0.99	0.9	2.1	0	1.51	1.9	1.7	0.8	1.50	1.7	1.3	1.5
Solvents	1.28	2.1	1.7	0	1.01	1.7	1.2	0.1	1.52	1.9	1.5	1.2
4-MTA	1.44	2.2	2.1	0	1.30	1.0	1.7	0.8	1.06	1.2	1.0	1.0
LSD	1.13	1.7	1.4	0.3	1.23	2.2	1.1	0.3	1.32	1.6	1.3	1.1
Methylphenidate	1.32	1.2	1.3	1.6	1.25	1.4	1.3	1.0	0.97	1.1	0.8	1.1
Anabolic steroids	1.45	0.8	2.0	1.7	0.88	1.1	0.8	0.8	1.13	1.3	0.8	1.3
GHB	0.86	1.4	1.2	0	1.19	1.4	1.1	1.1	1.30	1.4	1.3	1.2
Ecstasy	1.05	1.6	1.6	0	1.13	1.5	1.2	0.7	1.09	1.2	1.0	1.1
Alkyl nitrites	0.93	1.6	0.9	0.3	0.87	1.6	0.7	0.3	0.97	0.8	0.7	1.4
Khat	0.50	0.3	1.2	0	1.04	1.6	1.2	0.3	0.85	0.7	1.1	0.8

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4-MTA indicates 4-methylthioamphetamine; LSD, lysergic acid diethylamide; GHB, gamma 4-hydroxybutyric acid.

permanent dementia. And fast drinking of large quantities of alcohol can be lethal in teenagers and young adults. Compared with cannabis, alcohol can cause severe impairment of judgment, which can result in greater concurrent use of hard drugs. He argued that marijuana is not "a gateway drug," which leads to the use of more serious drugs. He opined that that view is not born out in practice, except that the illegal purchase of cannabis often exposes consumers to dealers who push the hard stuff. If marijuana were purchased at liquor stores rather than on street corners, where heroin and crack are also sold, there might be a decrease in use of more serious drugs.

Additionally, he argued that the nation badly needs the revenue of a "sin tax" on marijuana akin to alcohol and tobacco taxes. He also argued that our government could also save money by ending its battle against marijuana and the drug war and redirecting funds to proactive drug education and substance abuse treatment. He concluded that the only rational approach to cannabis is to legalize, regulate, and tax it. It is not logically or morally consistent in his view to criminalize marijuana and not cigarettes and alcohol.

In January 2010, the top drug adviser in the United Kingdom, Dr. David Nutt, was fired because he said in a lecture that alcohol is more hazardous than many outlawed substances and that the United Kingdom might be making a mistake in throwing marijuana smokers in jail (17). His comments were based on a list—a scientifically compiled ranking of drugs, assembled by specialists in chemistry, health, and enforcement—and published in *Lancet* (18). The list *(Table 2)* ranked a set of common drugs, both legal and illegal, in order of their harmfulness—how addictive they were, how physically damaging, and how much they threatened society. Many drug specialists now consider it one of the most objective sources available on the actual harmfulness of different substances. The ranking showed with numbers what Nutt was fired for saying: overall, both alcohol and cigarettes are far worse than many illegal drugs. Smoking pot is less harmful than drinking alcohol. And LSD is less damaging yet. Nutt in his defense stressed that he was pressing the point that a government policy, especially a health-related one like a drug law, should be grounded in factual information. In doing so, he found himself caught in a cross-fire that cost him the advisory post he had held for decades.

The same issue is becoming a hot one in the USA. In late 2009, the Obama administration took a baby step toward easing federal scrutiny of medical marijuana use, and a policy report due in early 2010 is expected to emphasize addiction prevention and treatment over criminal enforcement. But drug laws are rooted in history and politics as much as in science. Our own culture embraces one intoxicant—alcohol—which appears to be far more dangerous than 15 other harmful substances.

DOCTOR AND PATIENT COMMUNICATION AND THE INTERNET

According to Stone (19), half of patients admit to not understanding what their physicians told them during an office visit, which averages 15 minutes with primary care physicians. Perhaps that is why so many patients are now turning to the Internet. A June 2009 survey from the Pew Internet and American Life Project estimated that just over 60% of American adults surf the Web for health information, with many looking for writings by others with similar medical conditions (20). Reader interaction websites are playing larger roles in providing information tailored to online patients. There are thousands of blogs and Facebook groups. Patients use Twitter to share tips on battling various diseases or to give advice on finding the right doctor or hospital. But, not all medical information on the Internet is credible. With 25% of all American adults now reading blogs, combined with 120 million monthly visitors to Facebook and Twitter, social media websites present good opportunities for physicians to better interact with patients.

More than two thirds of physicians do not e-mail their patients. There is little guidance on how physicians can incorporate these social media websites into their medical practice. Because most insurers pay physicians only when they talk to patients in their offices, there is little financial incentive for physicians to reach out to patients over the Web. Nevertheless, physicians who are not active online risk being marginalized. Facebook and Twitter users, more than half of whom are <35 years of age, rely on the Web for most of their information. As these potential patients get older, they may rely more on the social media than their physicians to answer their health questions. Some hospitals already post emergency department wait times and update family members on the status of their loved ones during surgery on Twitter. The Centers for Disease Control and Prevention uses its prominent Facebook following to keep the public abreast of dynamically changing events such as the status of the H1N1 influenza pandemic. As Kevin Pho, a primary care physician in Nashua, New Hampshire, emphasized, quality health care requires a doctor-patient dialogue that does not end once the patient leaves the doctor's office or hospital. Physicians need to embrace the social media as a way to continue the conversation and to provide patients with the trusted health information that they need.

NORMAL-WEIGHT OBESITY

Romero-Corral and colleagues (21) from the Mayo Clinic studied 6171 American adults with normal body size as determined by body mass index (BMI) and measured their percentage of body fat. These investigators estimated that as many as 30 million Americans fall into the category of normal-weight obesity. High body fat among normal-weight men and women was associated with a nearly fourfold increase in the risk of metabolic syndrome. For women, high body fat meant a heightened risk of being diagnosed with cardiovascular disease over the 9-year course of the study. Both men and women had a higher risk of abnormal serum cholesterol levels, and men with high body fat were more likely to develop high blood pressure. All participants in their study had a BMI between 18.5 and 24.9 kg/m^2, a range considered normal weight under government guidelines.

The American College of Sports Medicine and the American Council on Exercise consider body fat percentages of 25% to 31% for women and 18% to 26% for men as "acceptable." Women with body fat of 21% to 24% and men with body fat

of 14% to 17% are "fit." People who reach even lower levels of body fat are considered "athletic." Reducing heart risk requires increasing the percentage of lean muscle mass at the expense of body fat, and that usually underscores the importance of both exercise and eating a healthy diet. Decreasing or restricting calories alone causes an equal amount of loss of body fat and lean muscle, which causes one to weigh less without significantly reducing the percentage of body fat.

SALT AND CARDIOVASCULAR DISEASE

We all know that salt is not good for us. Societies that eat no measurable salt daily have blood pressures about 90/60 mm Hg. In the USA, the Departments of Agriculture and Health and Human Services recommend daily intake of <5.8 g of salt (2.3 g of sodium), with a lower target of 3.7 g of salt per day for most adults (persons >40 years of age, African Americans, persons with hypertension) (22). Despite these guidelines, during the period from 2005 through 2006, the average man in the USA consumed an estimated 10.4 g of salt per day and the average woman, 7.3 g per day. Reducing dietary salt lowers blood pressure and the risk of cardiovascular disease. About 75% of the salt in the US diet comes from processed foods, not from salt added during food preparation or consumption. Many countries, including Japan, United Kingdom, Finland, and Portugal, have reduced population-wide salt intake through a combination of regulations on the salt content in processed foods, labeling of processed and prepared foods, public education, and collaboration with the food industry.

Bibbins-Domingo and colleagues (23) from San Francisco and Palo Alto, California, and New York, New York, explored the potential impact of a modest reduction in dietary salt on population health by using the coronary heart disease policy model, a computer simulation of heart disease in US adults aged 35 to 84 years. They found that reducing dietary salt by 3 g per day (1200 mg of sodium per day) reduced the annual number of new cases of coronary heart disease by 60,000 to 120,000, stroke by 32,000 to 66,000, myocardial infarction by 54,000 to 99,000, and deaths from any cause by 44,000 to 92,000. All segments of the population would benefit. The cardiovascular benefits of reduced salt intake are on par with the benefits of population-wide reductions in tobacco use, obesity, and cholesterol levels. An intervention designed to achieve a reduction in salt intake to 3 g per day would save 194,000 to 392,000 quality-adjusted life years and $10 to $24 billion in health costs annually. Even an intervention that would reduce salt intake by as little as 1 g per day would be more cost effective than using medications to lower blood pressure in all persons with hypertension. Throw away the salt shaker, but that only reduces salt intake by about 15%.

MEGA DISASTERS

As Florin Diacu, a Romanian-born professor of mathematics at the University of Victoria, Canada, so clearly detailed, mega and not-quite mega disasters are happening all the time (24). With the sudden disaster recently visited on Haiti, *Mega Disasters: The Science of Predicting the Next Catastrophe* seems eerily prescient. Just in the past 60 years we have had 3 of the most powerful earthquakes ever measured (Chile in 1960, Alaska in 1964, and the Indian Ocean in 2004); the highest ocean wave in recorded history when a massive rock fall pounded the Gilbert Inlet of Lituya Bay in Alaska in 1995 and created a wave that reached up to 1720 feet; and the deadliest tsunami—a result of the 2004 earthquake in the Indian Ocean. The book provides a grand tour of catastrophes, from cosmic collisions to financial crashes, and looks at the mathematical or lack of mathematical understanding behind them.

Predicting where and when these disasters will occur is as yet impossible. The recent earthquake in Haiti was not foreshadowed by any statistical evidence. The lay of the island signaled that there had been major earthquakes in the past but not for 200 years; the Enriquillo-Plantain Garden fault line, which runs from the middle of Dominica down through Haiti to Jamaica, was thought to be dormant. In the event that Haiti had trembled in advance of the quake, the likelihood of disaster still would have been slim; only 6% of small tremors, Dr. Diacu observed, are succeeded by major seismic events. In earthquake-prone China, there were 30 false alarms between 1996 and 1999, leading the Chinese government to conclude that it was counterproductive to sound an alarm each time the ground shook. These unpredictable mega disasters can kill more people in a few seconds than physicians can save in a lifetime.

DALLAS CRIME

In 2009, 81,585 crimes were committed in the city of Dallas, an average of 224 each day (25, 26). This number, almost certainly underreported, was down 6.4% compared with 2008. Homicides in 2009 were down to 166, the fewest since 1967 when 133 people were killed in the city. The year 2009 was the sixth consecutive year that reported overall crime went down. There was 23% less violent crimes in 2009 than in 2008. The Dallas Police Department now has about 3640 officers, an increase of 700 officers since 2004. The "fusion center" created in 2007 has given the department an edge in quickly analyzing and distributing information to patrol officers and detectives. And Dallas also has fewer older apartment complexes, which often serve as havens for criminals, than it once had. These crime figures are very important to the city because the federal government uses them to determine how much grant money the local police receive. In 2008, Dallas had the distinction of having the highest crime rate of any US city with >1 million people. In 2009, that distinction was passed to San Antonio, and Dallas fell to number 2. The lower the crime rate and specifically the violent crime rate, the fewer the number of patients coming to the emergency rooms. Thus, low crime rates not only save people but also save health care dollars.

TEXTING WHILE DRIVING

The federal government in January 2010 banned texting on handheld devices for bus drivers and commercial truckers (27, 28). The new restrictions went into effect immediately and apply to interstate truckers and operators of vehicles carrying at

least 8 passengers. Violators face penalties up to $2750. Good for the federal government.

Americans send about 135 billion text messages a month, and nearly 6000 deaths each year involve distracted drivers, according to the National Highway Traffic Safety Administration. That of course is more than the combined toll from the wars in Iraq and Afghanistan so far. Although the distracted-driving category also includes such activities as talking on cell phones, conversing with passengers, and eating, texting while driving is the clearest menace because it requires looking away from the road. So far 19 states and the District of Columbia outlaw the practice of texting while driving. These types of laws also lower the cost of medical care because they prevent accidents.

DYING IN 2010

As Al Neuharth, the founder of *USA Today,* wrote: "If you are old and/or sick and have some valuable stuff in your estate, it might be a little less painful for your family—at least financially—if you die in 2010" (29). The death tax, the double dip on earnings on which an assortment of taxes has already been paid, expired December 31, 2009. Under the Bush law, the death tax has just this 1-year hiatus. Unless Congress acts to preserve it, it will return in 2011 to the high 55% rate of 2001. If Congress quits spending hundreds of millions trying to build nations in ungovernable places like Afghanistan and Iraq, we could afford to let our old or sick or well-to-do die without the additional suffering financially for their families.

KIDS' DIGITAL DAY

According to a survey by the Kaiser Family Foundation of 2002 people aged 8 to 18 years, 7 hours and 38 minutes out of every 24 hours is spent using media in a typical day (30). These kids spend an average of 53 hours per week with electronic media—cell phones, iPods, video games, and computers. In contrast, although the daily book readership rate has held steady at about 47% for the last 10 years among this age group, the percentage of young people who say they read a magazine every day has fallen to 35% and newspapers to 23%. African American and Latin American kids spend nearly one third more time each day with electronics than European American kids. Since 2004, cell phone ownership among this age group has increased from 39% to 67% and iPod ownership, from 18% to 76%. The near ubiquity of mobile devices has had a profound effect on kids' free time. Clearly, iPods and cell phones are this generation's magazines and chewing gum.

HAPPINESS

Marshall and Kelly Goldsmith recently surveyed over 300 well-educated (>60% had graduate degrees) managers, entrepreneurs, and professionals (split almost evenly between the sexes), eliciting their insights into short-term satisfaction (happiness) and long-term benefit (meaning) (31). They found that there was an incredibly high correlation between people's happiness and meaning at work and at home. Those who experienced happiness and meaning at work tended also to experience them outside of work. Those who were miserable on the job were usually miserable at home. Because work and home are very different environments, our experience of happiness and meaning in life appears to have more to do with who we are than where we are. Rather than blaming our jobs, our managers, and our customers—or our friends, family members, and communities—for our negative work-life experience we might be better served simply by looking in the mirror.

The Goldsmiths offered a few take aways from their initial research. First, reduce TV watching. It may be stimulating, but it does not increase overall satisfaction with life at home or at work. Second, cut back on surfing the Web for nonprofessional reasons. It correlates negatively with both happiness and meaning. Third, spend time exercising and with people you love. Finally, challenge yourself. Feeling challenged was linked to greater satisfaction.

LIVESTOCK DEMAND, LIVESTOCK EMISSIONS, AND CREATING MEAT IN THE LABORATORY

Current United Nations figures blame livestock production for 18% of global greenhouse gas emissions (32). Meanwhile, demand for meat is skyrocketing, particularly in developing countries such as India and China where rising incomes have expanded the appetite for meat in the daily diet. By 2050, global demand for meat protein is expected to double. Producing meat presently is very inefficient and probably not sustainable. Professor Mark Post, chairman of the Department of Physiology at Maastricht University, in his laboratory is trying to transform stem cells harvested from one live pig into a quantity of meat that on the farm would require the slaughter of 1 million animals. Professor Post added that the environmental damage caused by current meat production practices—from the fertilizer used in feed production to the waste produced by the animals—will continue to rise with demand. Moving meat production from the farm to the laboratory could take pressure off the environment and the global food supply. Currently, their lab-produced pork resembles a soft sea scallop more than the muscle (pork) of a land-raised hog. Post's group in the laboratory can make muscle cells and can grow them, multiply them, and train them. But, they can't get these muscle cells to look like the pork that we are used to finding on our plate. This is new stuff to me. If lab-produced pork and other animals' muscle can be made to look like the real thing, I am sure it will make the pigs, cows, sheep, goats, etc., much happier.

SYLVESTER GRAHAM (1794–1851), AMERICA'S FIRST HEALTH CARE REFORMER

As a Presbyterian minister he crusaded in the 1800s, delivering a popular health message of discipline, vegetarianism, abstinence, hard mattresses, cold showers, and a diet of grains, cereals, and fruits, with no meat, no alcohol, and no processed bread (33). Vegetarianism, he argued, cured alcoholism and curbed sexual excess. He attracted both passionate supporters and passionate critics. One critic, a professor at Oberlin College, lost his job when he sneaked a jar of pepper into the dining room to add spice to his meals after the college had adopted Graham's diet. As Graham's popularity grew, so did the intensity

of his opponents. When he and his crusaders approached Boston for a rally in 1837, police canceled it because of the violent welcome promised by the city's bakers and butchers. Nevertheless, Sylvester Graham persisted and left a legacy of health food—namely, cornflakes, invented by the Kellogg brothers of Battle Creek, Michigan, and his own patented "graham bread" with coarsely ground whole-wheat flour that has evolved into today's graham crackers.

PROTECTING PREGNANT DRIVERS

According to Sharon Silke Carty, writing in *USA Today,* there are 300 to 1000 fetal deaths because of car accidents each year in the USA (34). States are not required to report fetal deaths in data sent to the federal fatal accident system. Two universities are studying ways to provide protection for the driving pregnant mother. For now, safety experts advise pregnant women to wear the lap part of a seatbelt low over their pelvis, not over the soft belly, and to sit as far from the steering wheel as possible. The biggest danger in a crash for a pregnant woman is placental abruption, causing bleeding for the mom and cutting off blood supply to the baby. Because there is increased blood flow to that area in pregnancy, there also is a much higher risk of hemorrhaging for the mother after a crash.

MEDICAL SCHOOL ENROLLMENT

US medical schools continue to expand their enrollment (35). Enrollment grew by 2% in 2009, with just less than 18,400 students entering US medical schools. Since 2002, 57 US medical schools have boosted their enrollment by >10% and 12 others by at least 7%. Four new medical schools opened in 2009: Florida International University Herbert Wertheim College of Medicine; The Commonwealth Medical College (Scranton, PA); Texas Tech University Paul L. Foster School of Medicine; and the University of Central Florida College of Medicine. Together these new schools enrolled a total of 189 students. The number of medical school applicants remained stable: 42,269 applicants in 2009 compared with 42,231 in 2008. Medical school enrollment will continue to increase in 2010 when a new medical school, the Virginia Tech Carilion School of Medicine, is expected to seat its charter class. Additionally, 3 other schools are currently in development: Central Michigan University School of Medicine, Touro University College of Medicine in New Jersey, and Hofstra University School of Medicine in New York. The number taking the Medical College Admission Test is expected to increase by 3% in 2010. A shortage of 124,000 to 160,000 physicians is predicted in the USA by 2025. Unfortunately, a corresponding rise in graduate medical education slots will not likely increase anytime soon. The Resident-Physician Shortage Reduction Act, which would increase the number of Medicare-supported residency positions by 15,000, has not been included in any health care reform legislation at this point.

TWO SMALL BUT IMPORTANT BOOKS APPEARING IN 2009

One was *Abraham Lincoln* by James M. McPherson, the prominent historian from Princeton who has written several prize-winning books on the Civil War (36). It's only 77 pages in length, including the bibliography and notes. The year 2009 marked the 200th anniversary of Lincoln's birth, and this short biography offers an illuminating portrait of our finest president. Although there are an estimated 14,000 books on Lincoln, at least 20 appeared in 2009, and McPherson's biography surely must be the best shortest biography of, in my view, our greatest American.

The second is *Churchill* by the eminent British historian Paul Johnson (37). This book, a gift from my son Charles, begins as follows:

> Of all the towering figures of the twentieth century, both good and evil, Winston Churchill was the most valuable to humanity, and also the most likable. . . . No man did more to preserve freedom and democracy and the values we hold dear in the West. None provided more public entertainment with his dramatic ups and downs, his noble oratory, his powerful writings and sayings, his flashes of rage, and his sunbeams of wit. He took a prominent place on the public stage of his country and the world for over 60 years, and it seemed empty with his departure. . . . How did one man do so much, for so long, and so effectively?

Excluding notes and bibliography, the Lincoln book is only 65 pages long, and the Johnson book, 166 pages, and both are printed double-spaced. It is hard to find better short biographical reads than these 2 books.

MARSHALL NIRENBERG (1927–2010)

Marshall Nirenberg was a lab chief in the National Heart, Lung, and Blood Institute during my entire time (32 years) at the National Institutes of Health (NIH). During the monthly lab chiefs' meeting, which included 17 lab chiefs, I somehow nearly always sat next to Marshall Nirenberg, a soft-spoken, friendly, humble, and pleasant man. He died in January 2010 at age 82 (38). Although born in New York City, the son of a shirt manufacturer, the family moved to Orlando, Florida, when Marshall was 8 years of age because he had had rheumatic fever and the family was advised to put him in a warmer climate. In Florida, the father went into the confectionary business. Pre–Disney World Orlando was swampy and full of wildlife, and the young Nirenberg became an expert bird watcher and entomologist. He even collected spiders on behalf of the American Museum of Natural History. After deciding he didn't like the family candy business, Nirenberg earned a doctorate in biochemistry in 1957, studying metabolic processes at the University of Michigan, and immediately thereafter went to work at NIH.

The question of how DNA and RNA created the 20 amino acids that are the building blocks for proteins was among the most pressing in biochemistry at the time. Nirenberg and his early partner, J. Heinrich Matthaei, beat out several better-equipped teams in the genetic coding race, which provided the conceptual framework for the human genome project and cloning. Nirenberg and his team produced a table specifying code sequences and their corresponding amino acids that has

been called "a Rosetta stone for genetics." He completed the translation table in 1965, and he shared the 1968 Nobel Prize for physiology or medicine with 2 other researchers who had worked on the problem. (He was the first person working at NIH to win a Nobel Prize.)

By then, Nirenberg had moved on from protein synthesis, the hot topic of the 1950s, to what he considered the next big question in biology: the development of the nervous system. He went on to make important contributions to fruit-fly genetics, and his laboratory was a fertile source of generations of genetics researchers. He worked in his lab until just a few days before his death, conducting research on the chemical basis for addiction and memory as well as fruit-fly genetics. He filled hundreds of notebooks with scientific ideas, comparing the process to tossing many darts, a few of which hit the bulls-eye. He showed that a brilliant person can be humble, modest, kind, and generous.

ANDY ROONEY

On January 14, 2010, Andy Rooney turned 91 years of age (39). His job as TV's longest-running curmudgeon started 31 years ago when he was a summer replacement on *60 Minutes*. He also has a weekly syndicated newspaper column. His TV essays have become a Sunday night ritual. His 16th book, *Andy Rooney: 60 Years of Wisdom and Wit,* a collection of previous writings, was published in November 2009. Rooney has been on that show since 1978. His wife of 62 years died 6 years ago. They had 4 offspring. Brian, 58, is an ABC News West Coast correspondent; Emily, 59, hosts a public TV talk show in Boston; her twin, Martha, works at the National Library of Medicine in Bethesda, MD; and Ellen, 62, is a photographer in London. As an army private he landed a job in 1942 as a reporter for the Armed Forces newspaper, *Stars and Stripes.* In London, he met Walter Cronkite, who became his closest friend at CBS, and Don Hewitt, who would start *60 Minutes* and have the idea in 1978 of putting Rooney on camera. Both Cronkite and Hewitt died in 2009. His on-camera *60 Minutes*' piece, called "A Few Minutes," started when Rooney was 60. I also had a career change at that age. It would be nice to stay around as long as Andy and be productive all the while.

OSAMA BIN LADEN AS FATHER

Omar bin Laden, one of Osama bin Laden's sons, and Omar's mother, one of Osama bin Laden's wives, wrote the book *Growing Up bin Laden,* which was published in October 2009 (40). The book describes a brood of children, up to 20, who were raised from an early age by an authoritarian father who shunned the luxury his inherited wealth could buy. The children who grew up in Saudi Arabia, Sudan, and Afghanistan without laughter or toys were routinely beaten and lost their pets to painful deaths from poisoned gas experiments by their father's fighters. When they became young adults, their father asked them to volunteer for suicide missions. When Omar protested, bin Laden was quoted as replying: "You own no more a place in my heart than any man or boy in the entire country. This is true for all of my sons." It was then, Omar recounted, that he "finally knew exactly where I stood. My father hated his enemies more than he loved his sons."

A 3-HOUR FOOTBALL BROADCAST

What is in a 3-hour football broadcast? The game, of course, officially is 60 minutes. According to a *Wall Street Journal* study of 4 recent broadcasts and similar estimates by researchers, the average amount of time the ball is in play on the field during a National Football League game is about 11 minutes (41)! In the other 169 minutes, commercials take up about 60 minutes; shots of players huddling or standing at the line of scrimmage or just milling about between snaps, 75 minutes; pictures of the network announcers, 30 seconds; the cheerleaders, 30 seconds; and shots of head coaches and referees, about 12 minutes. Football is a sport where often the clock runs for long periods of time while nothing happens. After a play is whistled dead, the clock continues to run even as the players peel themselves off one another and limp back to the huddle. The offensive team has 40 seconds after one play ends to snap the ball again. The typical play lasts only about 4 seconds, such that the ratio of inaction to action is approximately 10 to 1. Regular season football telecasts are major productions that can cost between $150,000 and $250,000. Anywhere from 80 to 200 people are on hand per game from the network with dozens of cameras, including 7 production trucks.

BURJ KHALIFA IN THE UNITED ARAB EMIRATES

It rises more than one-half mile into the sky (42, 43). It is more than 50% taller than the next tallest building on earth. Its actual height is 2717 feet, and it is located in Dubai in the United Arab Emirates. It is essentially a tapering metal and glass spire as a vertical city of luxury apartments and offices. It has 4 swimming pools, a private library, and a hotel. It is more than twice the height of New York's Empire State Building. Its reinforced concrete structure apparently makes it stronger than steel-framed skyscrapers. The building has the most stories and the highest occupied floor of any building in the world. There is a 60-mile view from its top. It has 160 floors, 54 elevators, 6 million square feet of floor, and 12,000 people can live there. It cost $1.5 billion. But why? It might take 15 minutes to get to one's apartment after entering the building. Not for me.

FEWER AMERICAN JOBS

My assistant, Ms. Becky Banks, found the following piece (44):

> John Smith started the day early,
> having set his alarm clock (MADE IN JAPAN) for 6 am.
> While his coffeepot (MADE IN CHINA) was perking,
> he shaved with his electric razor (MADE IN HONG KONG),
> and put on a dress shirt (MADE IN SRI LANKA),
> designer jeans (MADE IN SINGAPORE) and
> tennis shoes (MADE IN KOREA).
>
> After cooking his breakfast in his new electric skillet (MADE IN INDIA),

he sat down with his calculator (MADE IN MEXICO),
to see how much he could spend today.

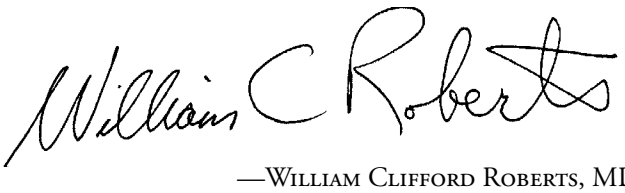
After setting his watch (MADE IN TAIWAN)
to the radio (MADE IN INDIA),
he got in his car (MADE IN JAPAN),
filled it with gas (from SAUDIA ARABIA)
to continue his search for a good paying AMERICAN JOB.

At the end of yet another discouraging and fruitless day,
checking his computer (made in MALAYSIA),
John decided to relax for a while.

He put on his sandals (MADE IN BRAZIL),
poured himself a glass of wine (MADE IN FRANCE)
and turned on his TV (MADE IN INDONESIA),

and then wondered why he can't find
a good paying job in AMERICA.

He is hoping he can get help from his president (MADE IN KENYA).



—William Clifford Roberts, MD
16 February 2010

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